

Hydrodynamic Effects of Delta- wide Tidal Marsh Restoration

Initial Evaluation/Preliminary Results

BDCP Steering Committee
October 3, 2008

PRELIMINARY DRAFT—NOT FOR DISTRIBUTION

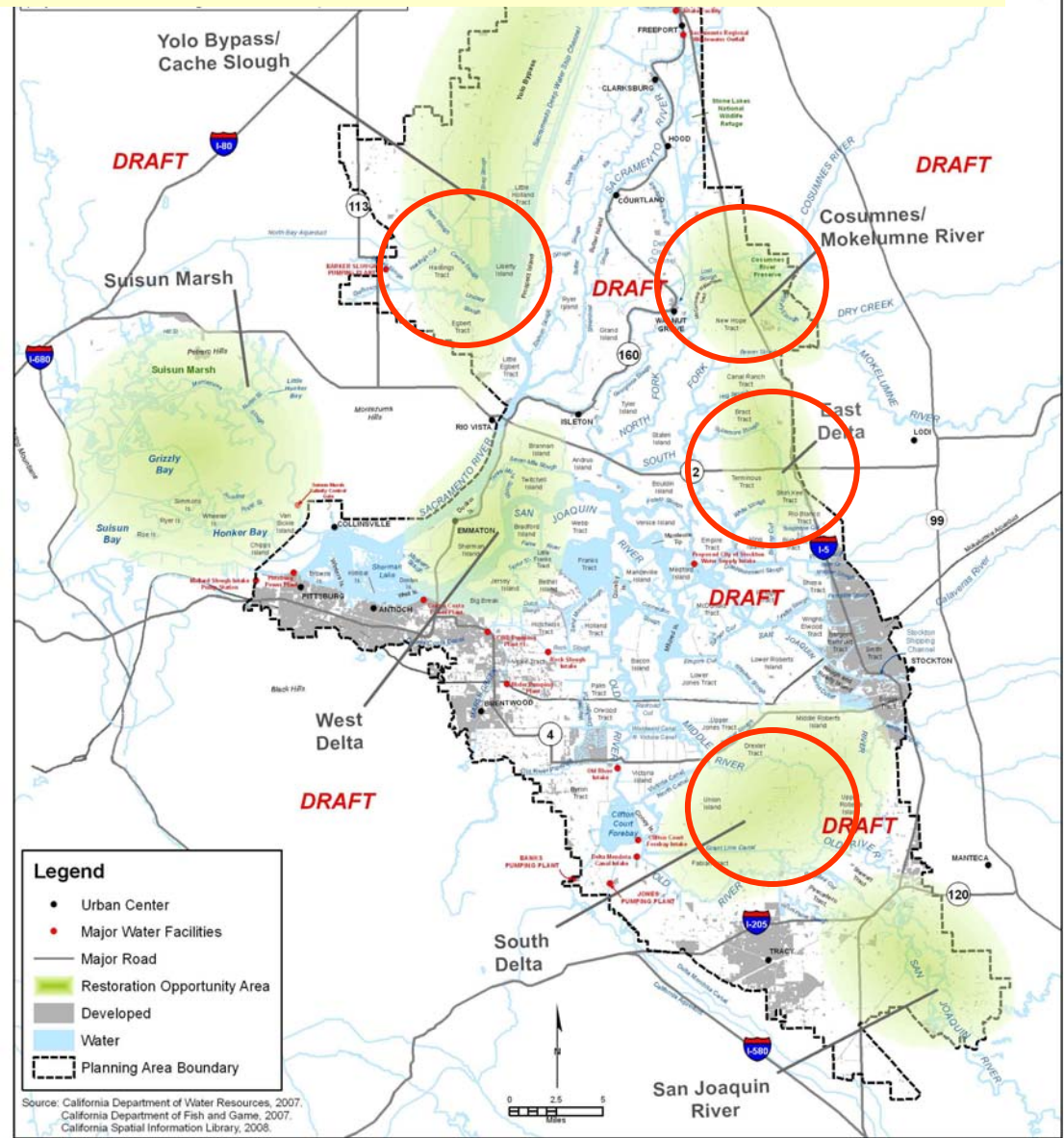
Evaluation Goals

- Using DSM2 model - test hydrodynamic effects of Delta-wide tidal marsh restoration on tidal flows by implementing the sample restoration in Restoration Opportunity Areas (ROAs)
- How are Sacramento River, Sutter Slough, and Steamboat Slough effected?
- Understand changes to the salinity regime

ROAs Simulated in DSM2

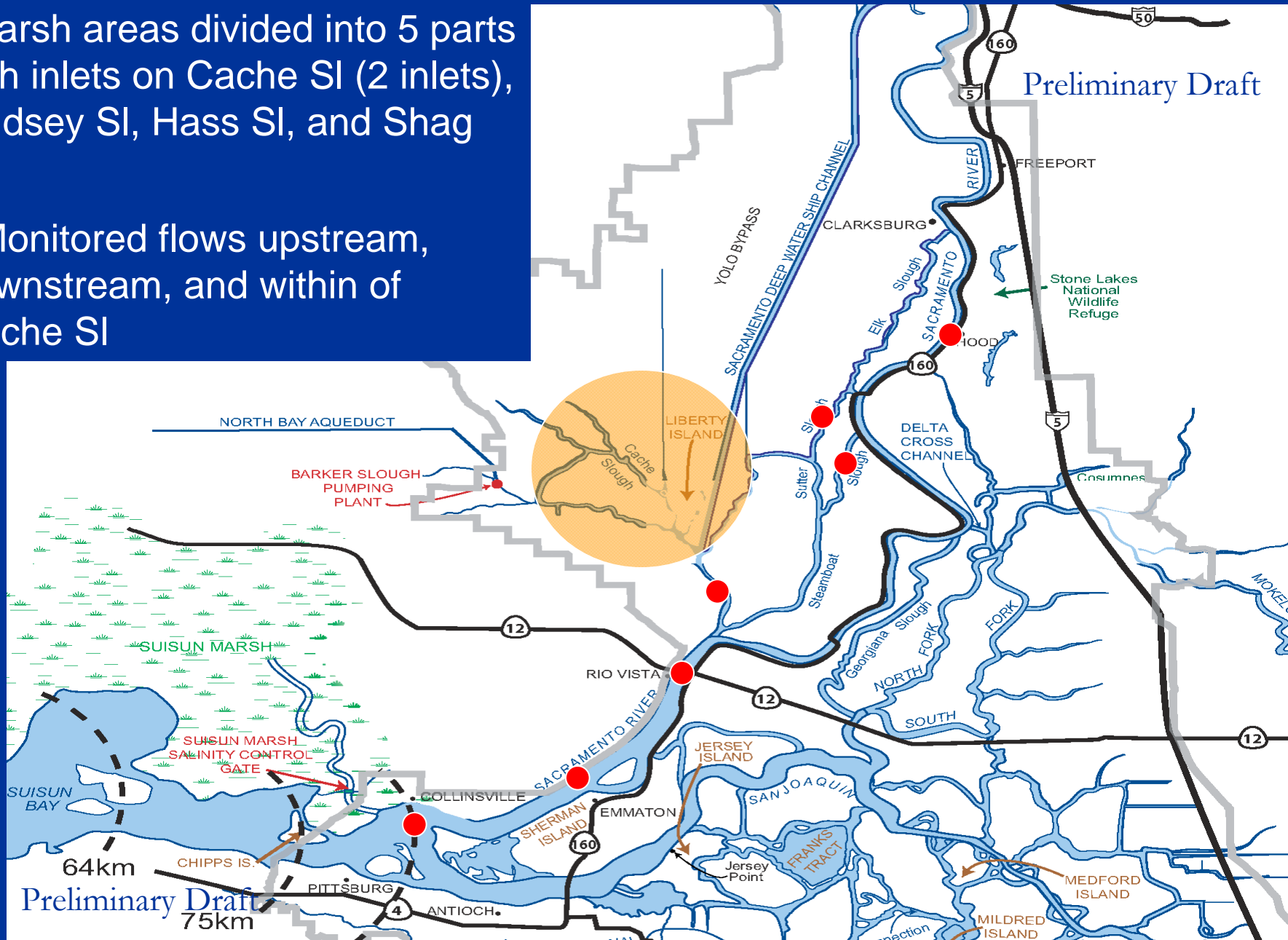
- Cache Slough Complex
- Cosumnes-Mokelumne
- East Delta
- South Delta
- ROAs treated as series of connected reservoir areas to emulate tidal prism changes
- Results show preliminary general patterns only

Preliminary Draft



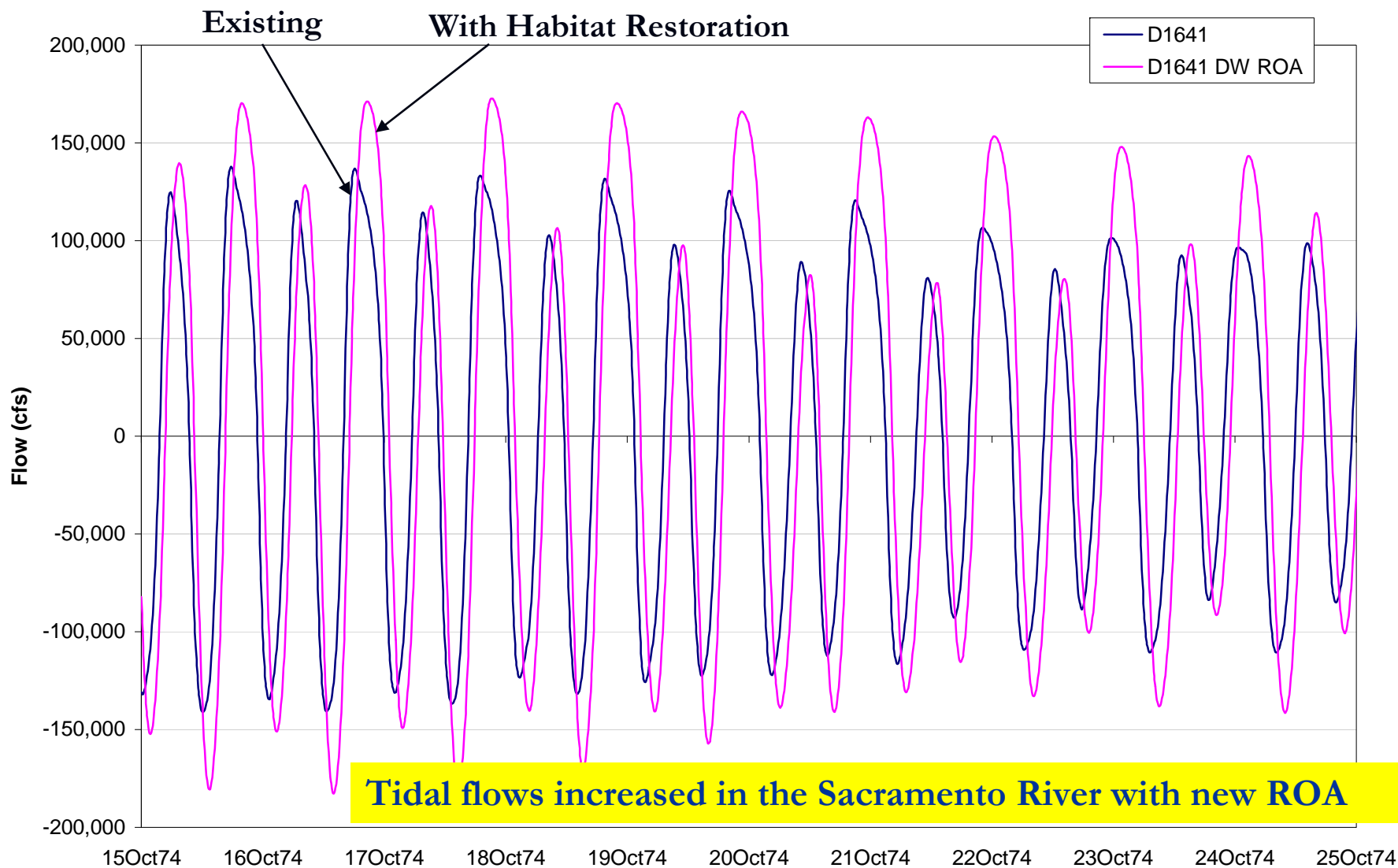
North Delta Tidal Marsh Assumptions

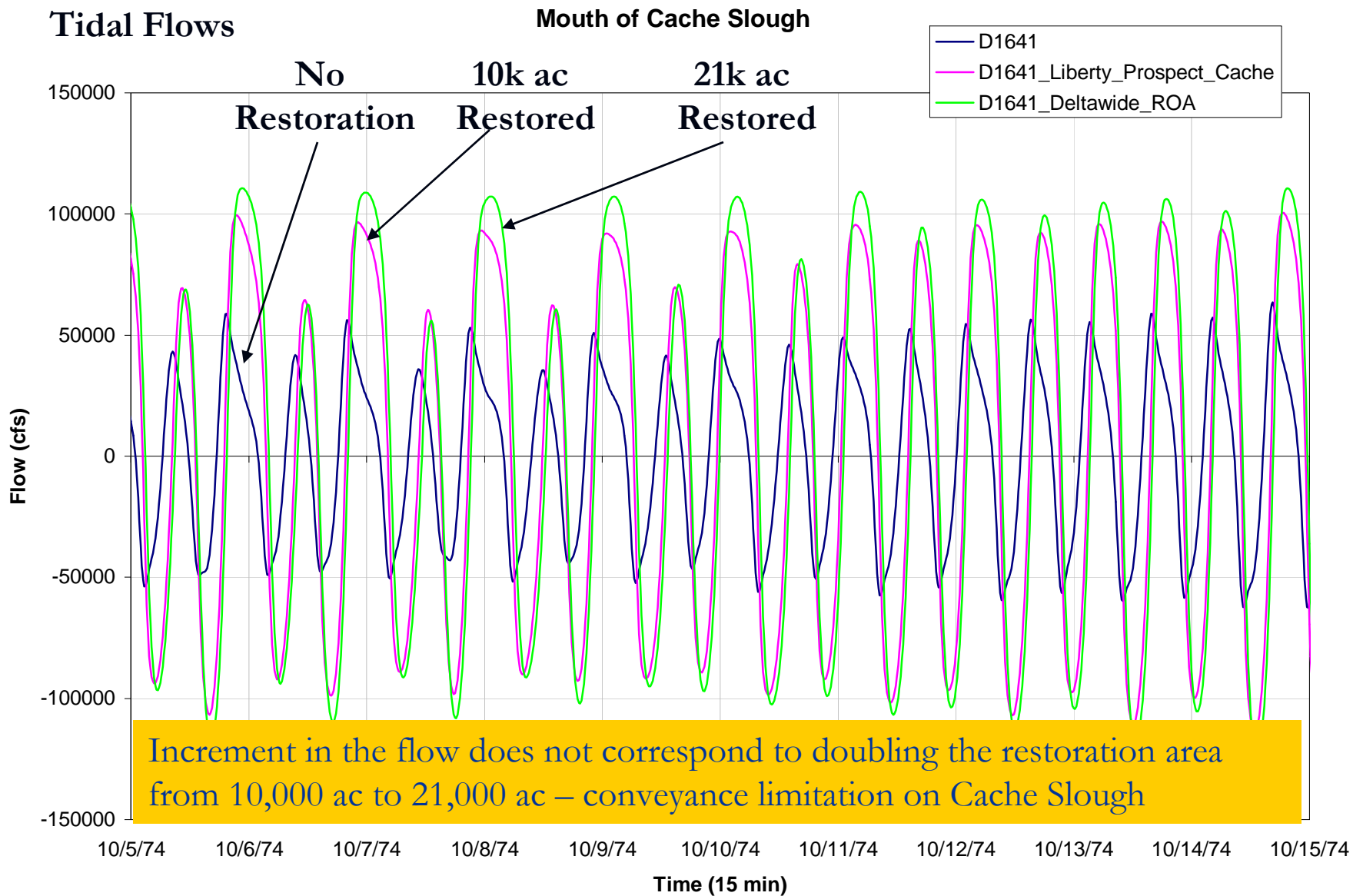
- Marsh areas divided into 5 parts with inlets on Cache Sl (2 inlets), Lindsey Sl, Hass Sl, and Shag Sl
- Monitored flows upstream, downstream, and within of Cache Sl

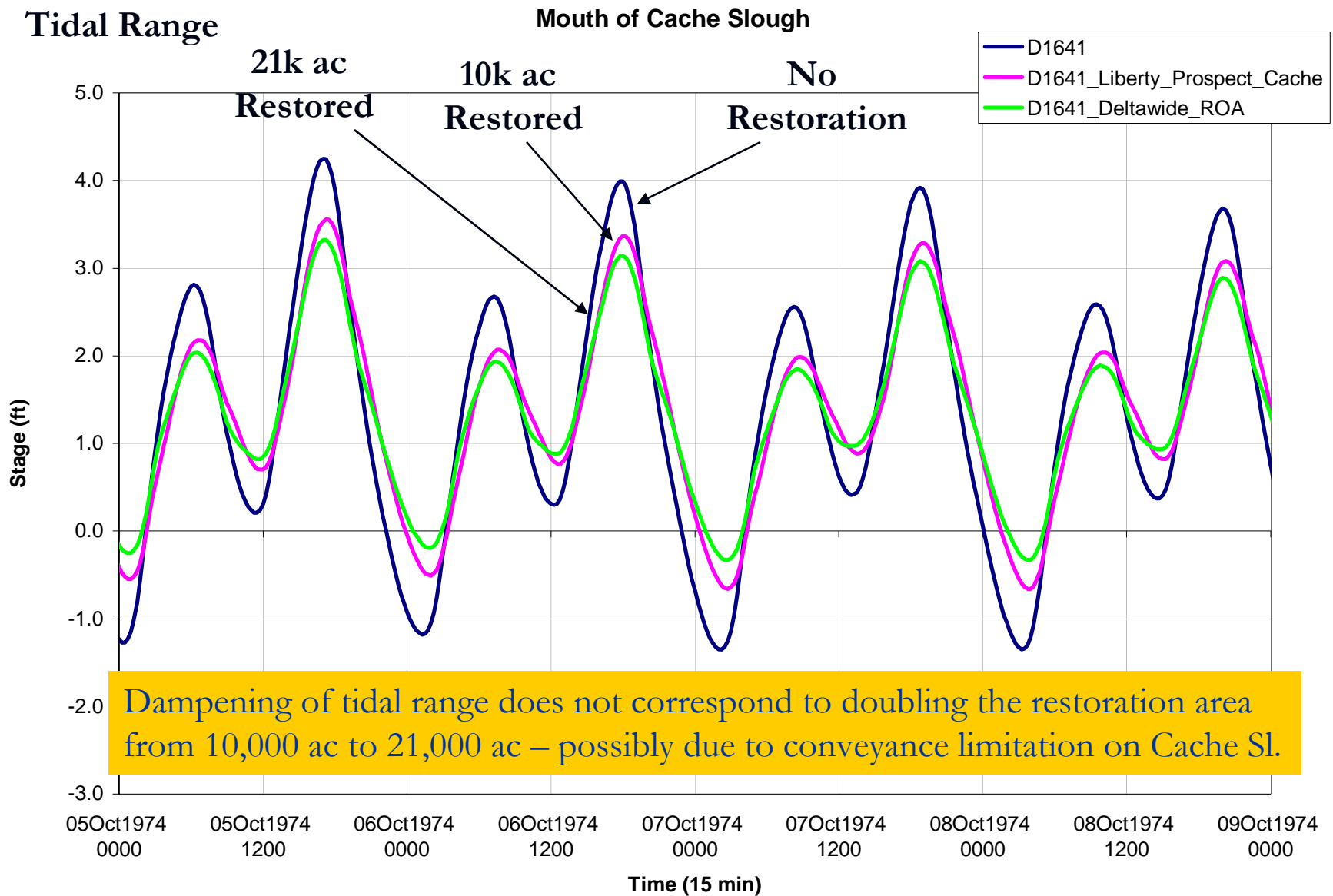


Tidal Flows

Sacramento River at Emmaton

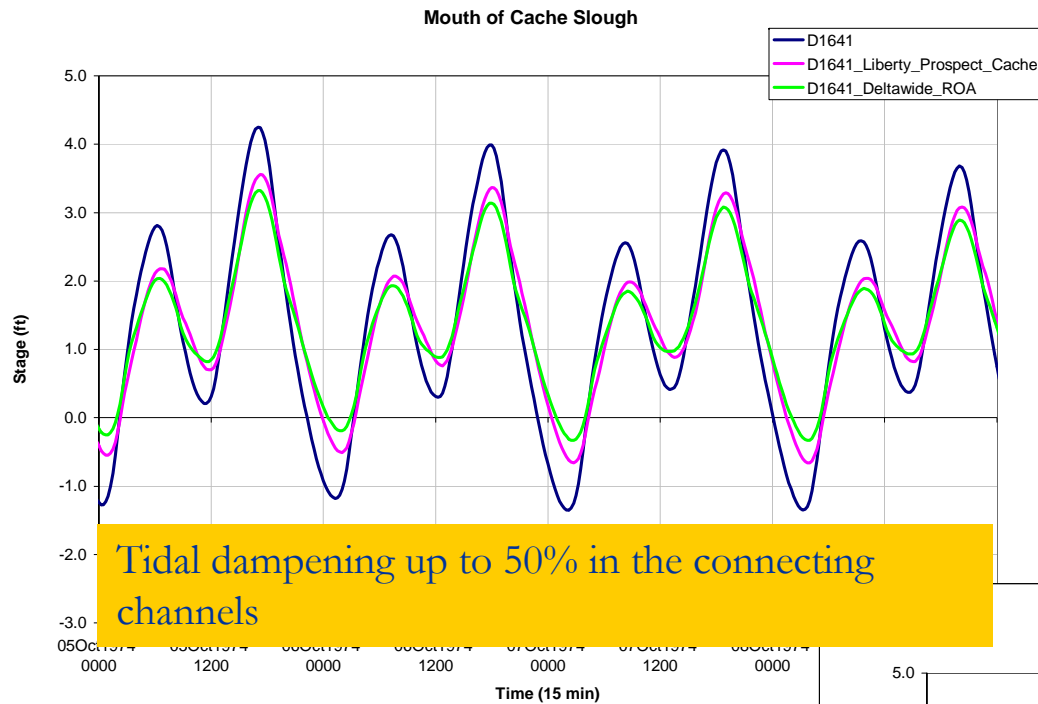




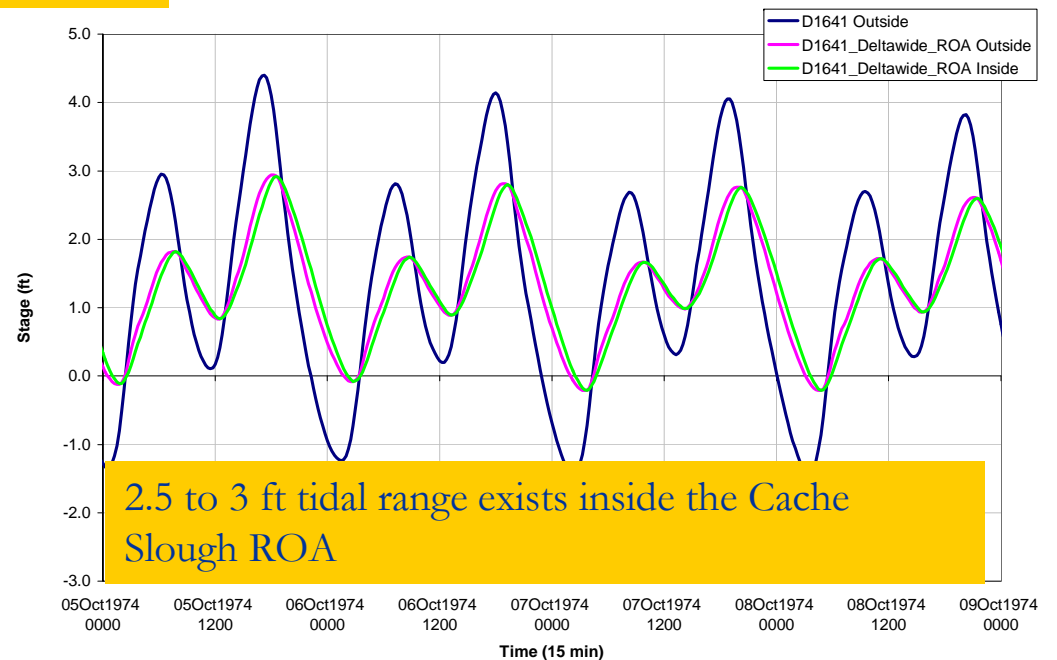


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Dampening of Tidal Range

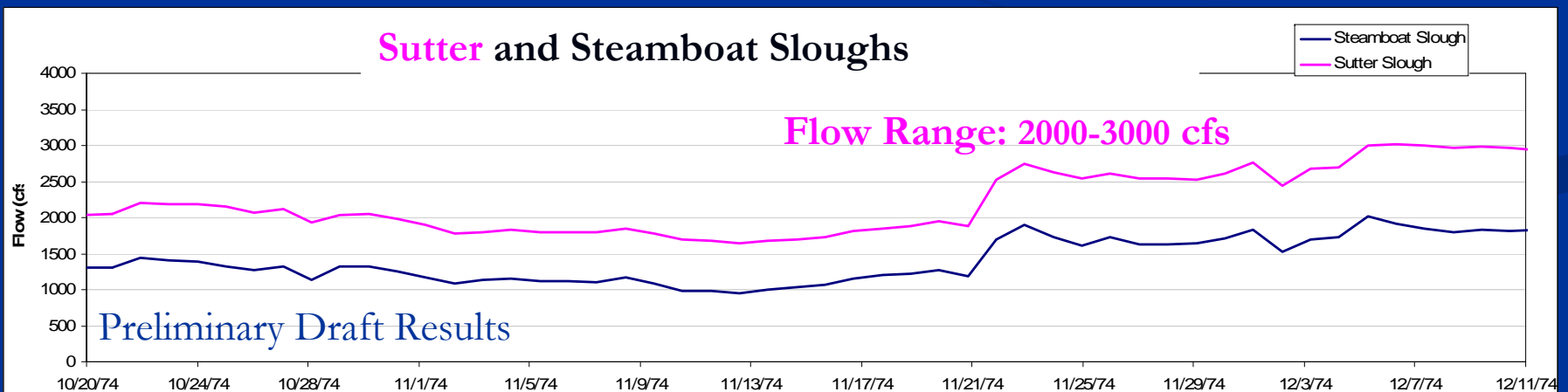
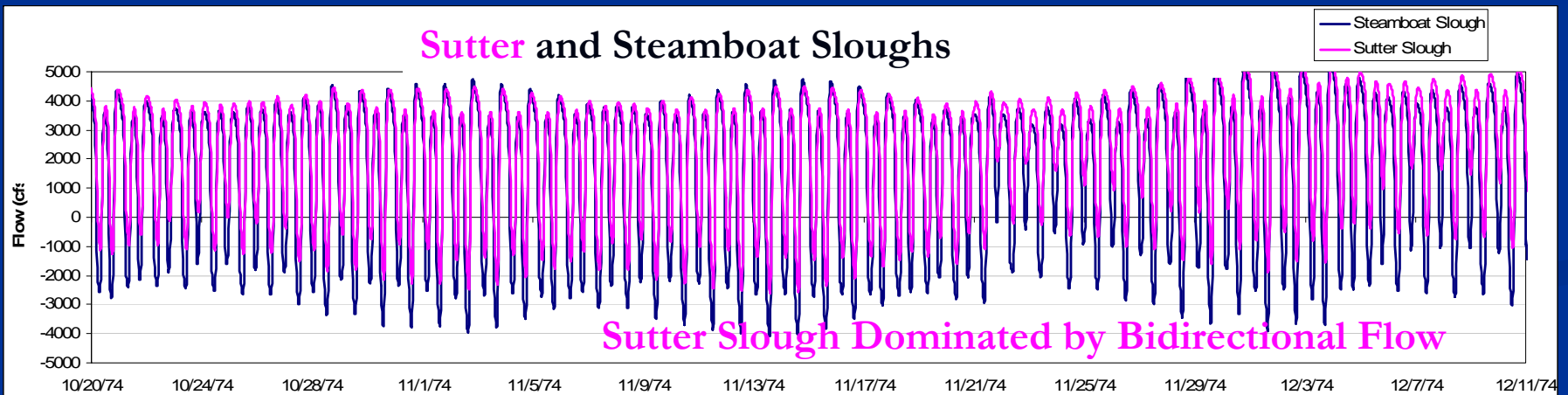
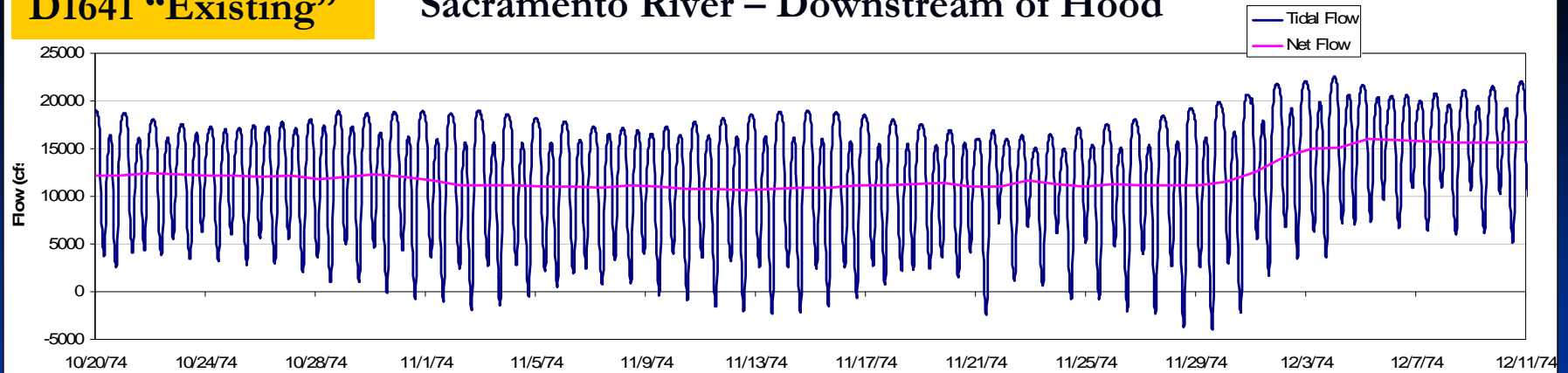


Tidal Amplitude Inside and Outside of Cache Slough ROA



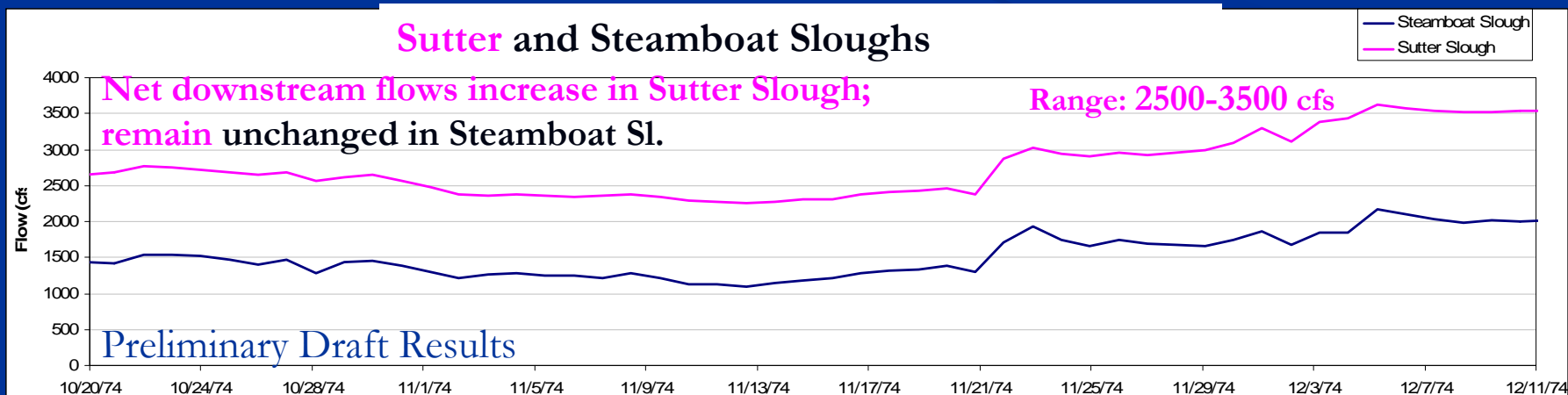
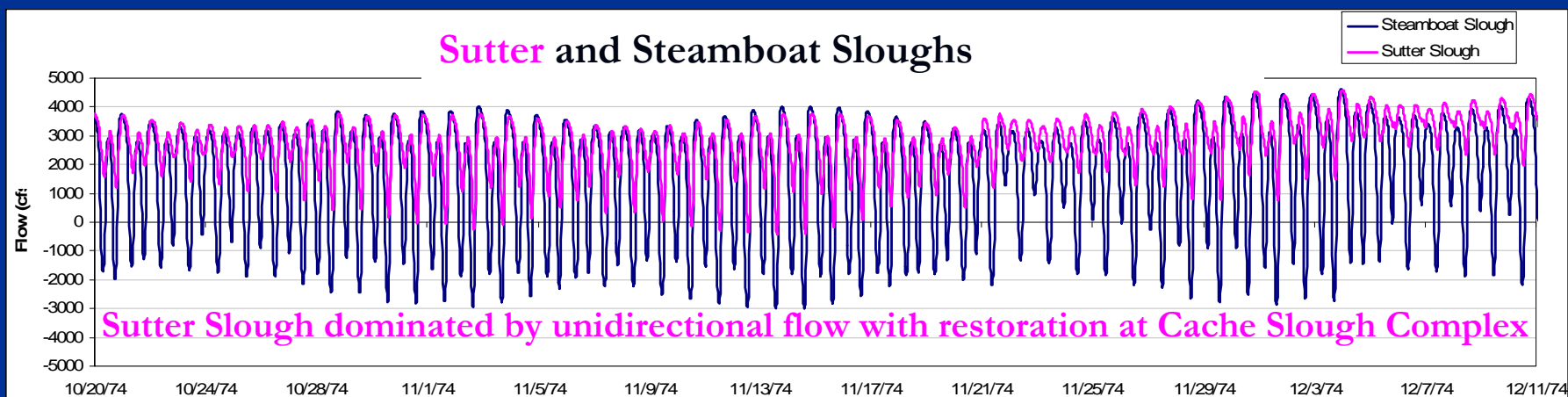
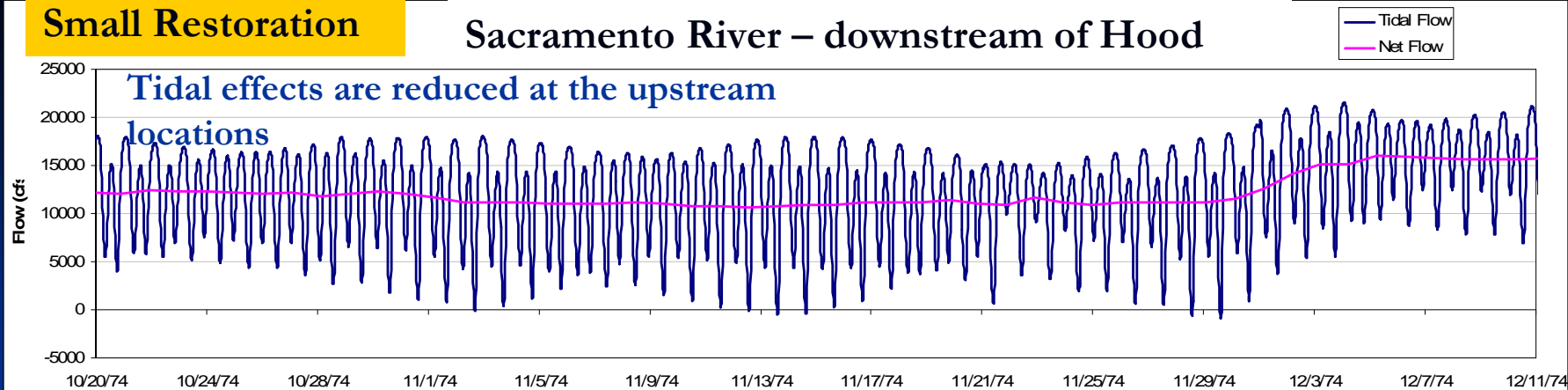
D1641 "Existing"

Sacramento River – Downstream of Hood



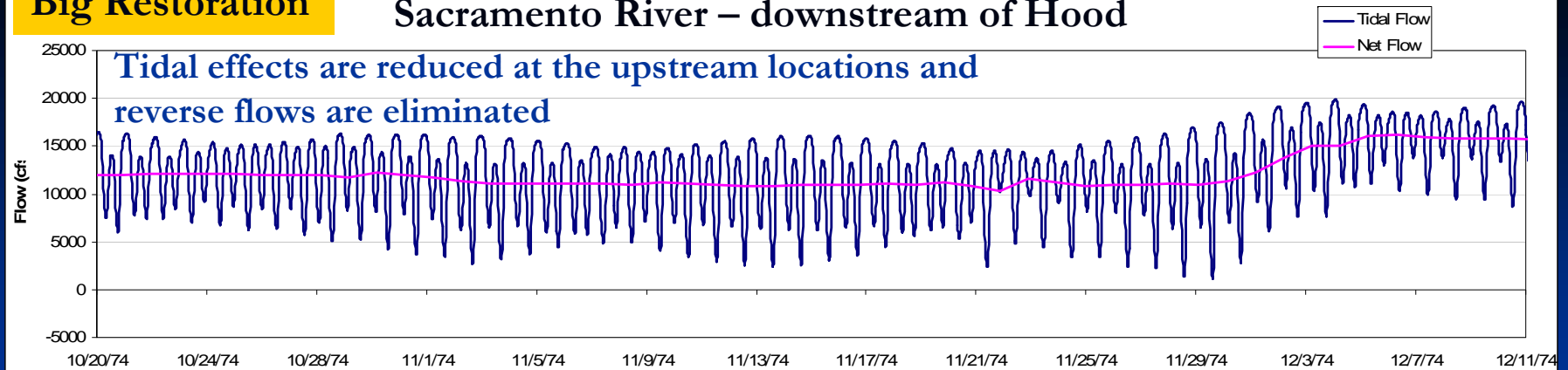
Small Restoration

Sacramento River – downstream of Hood

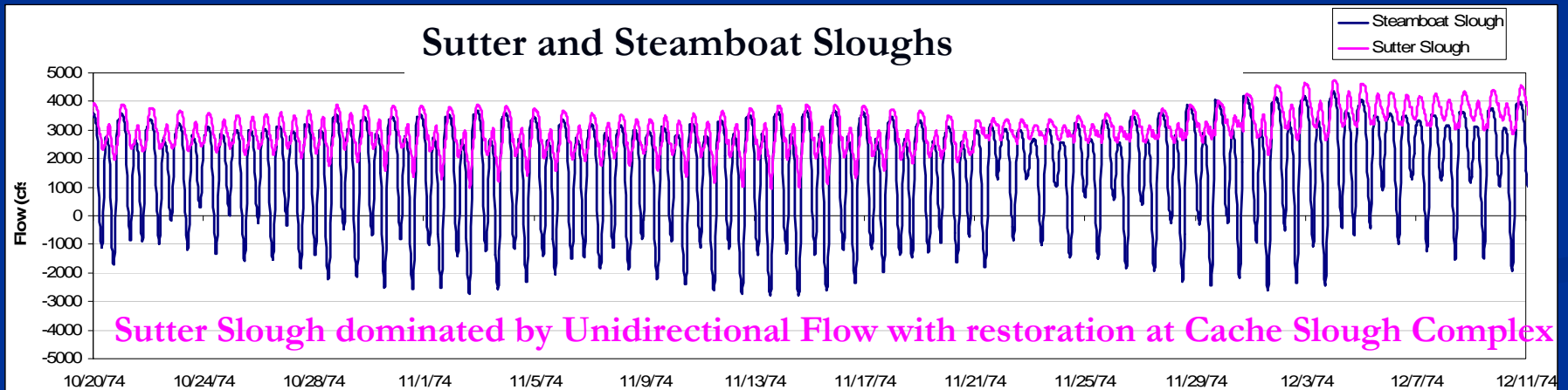


Big Restoration

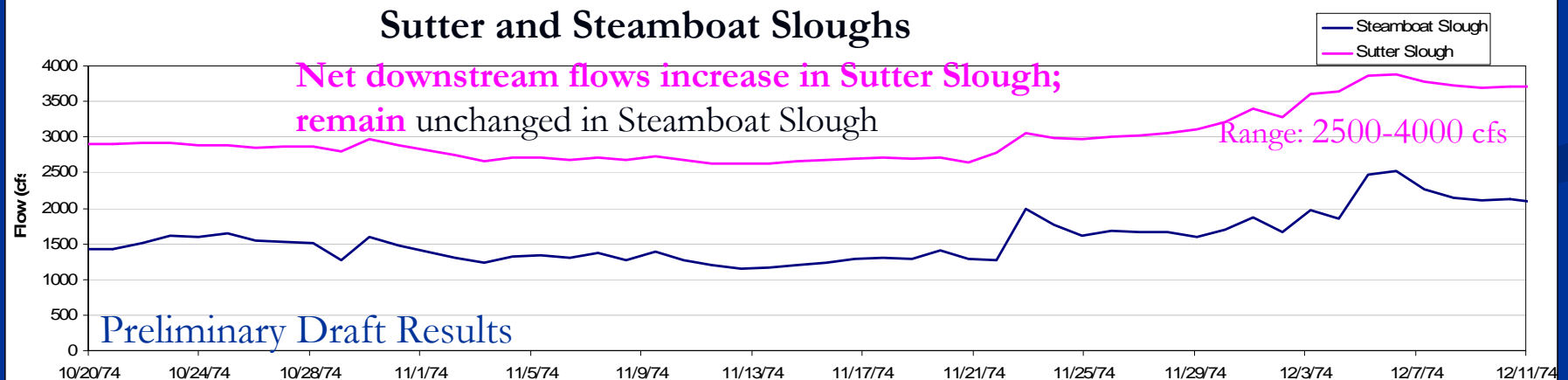
Sacramento River – downstream of Hood



Sutter and Steamboat Sloughs

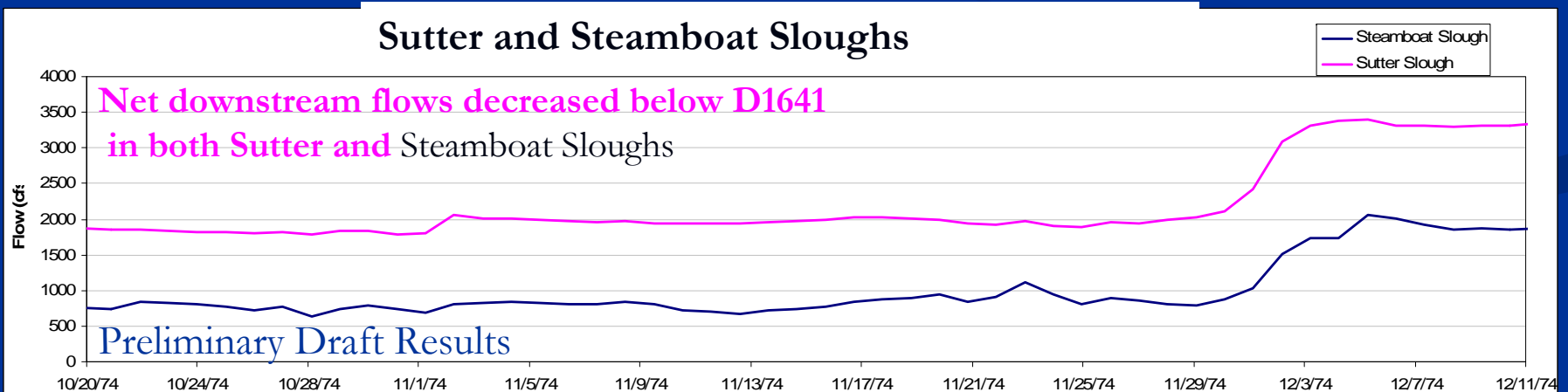
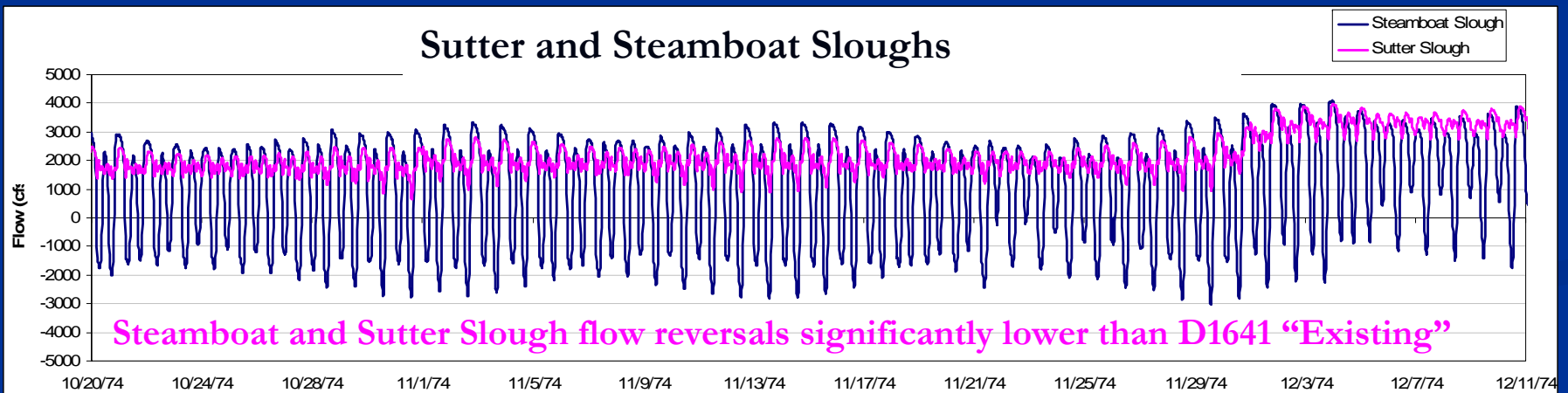
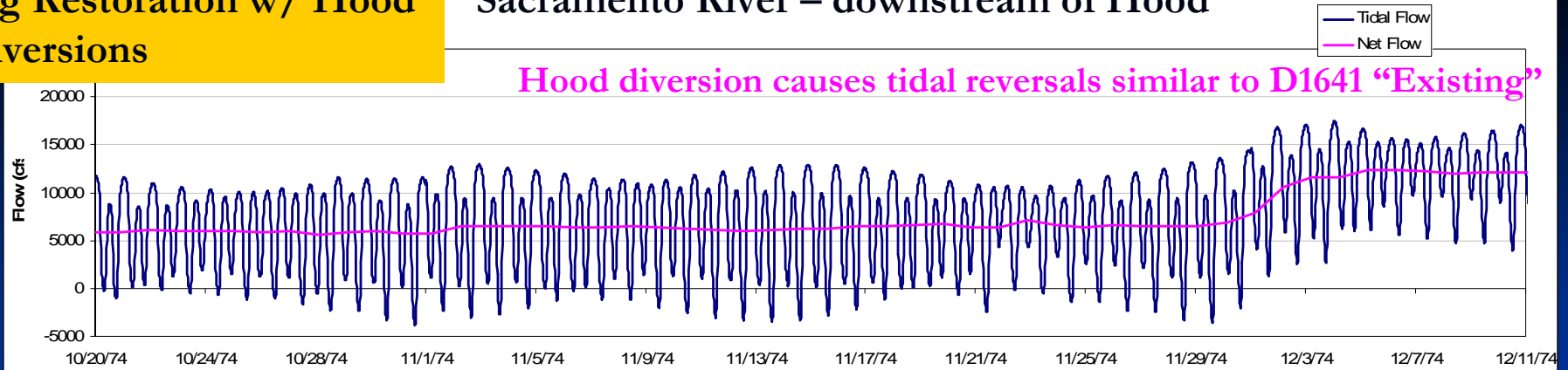


Sutter and Steamboat Sloughs



Big Restoration w/ Hood Diversions

Sacramento River – downstream of Hood



Key Points: North Delta Tidal Marsh

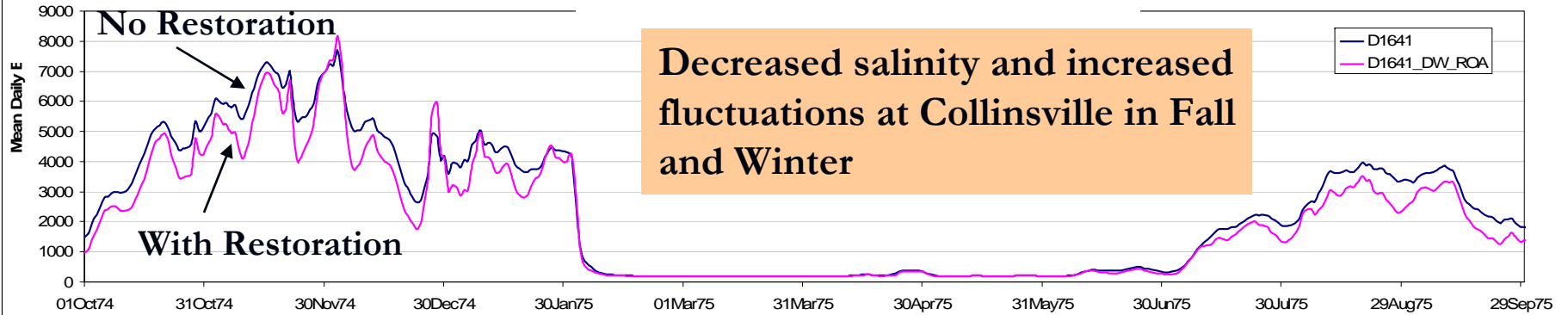
(Preliminary Results)

- Tidal flows increase with increased restored habitat
- Tidal amplitude significantly dampened in the connecting channels
- Tidal influence lessened at the upstream locations (more Riverine-type flows on Sacramento River)
- Sutter Slough remains net positive at low Sacramento River flows with the habitat restoration and Steamboat tidal reversal magnitudes reduced significantly
- Diversion at Hood causes increase in tidal flows compared to without diversion, but improved over existing conditions

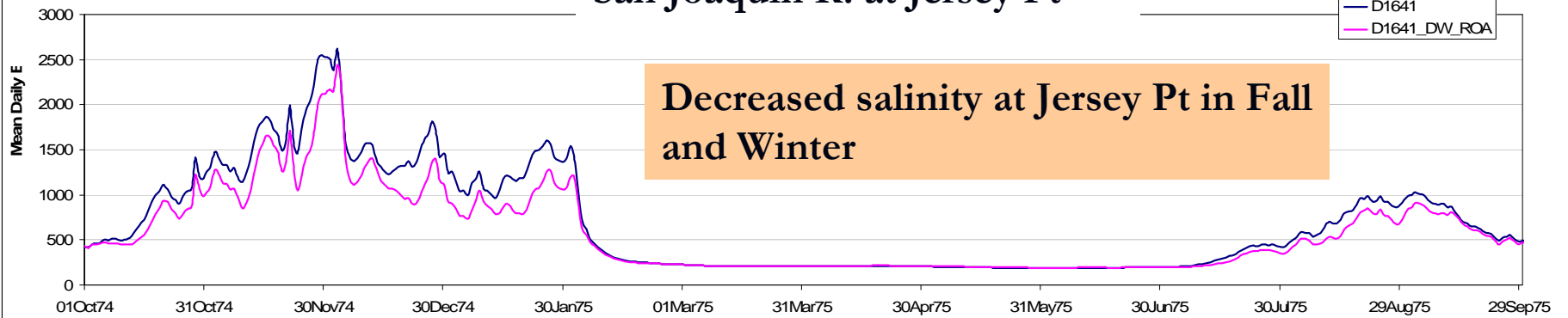
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Changes to the Salinity Regime

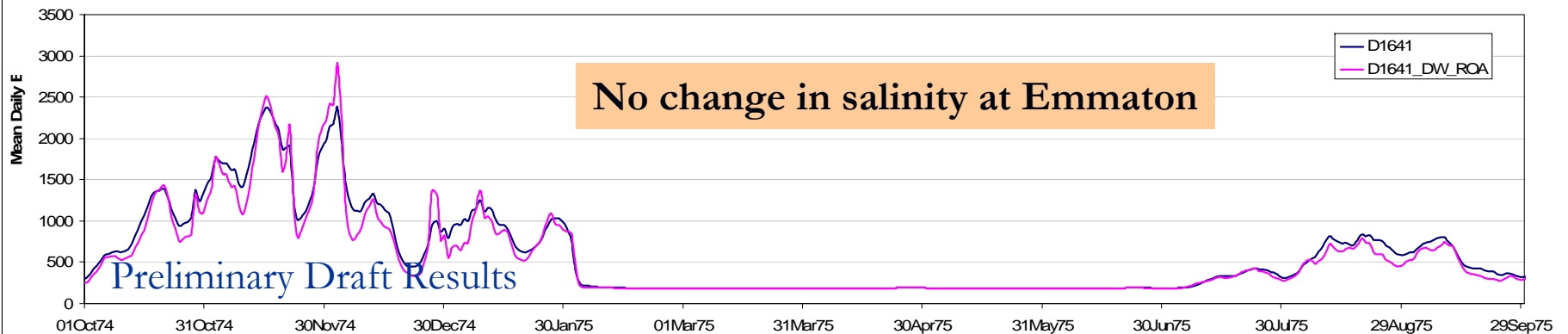
Sacramento R. at Collinsville



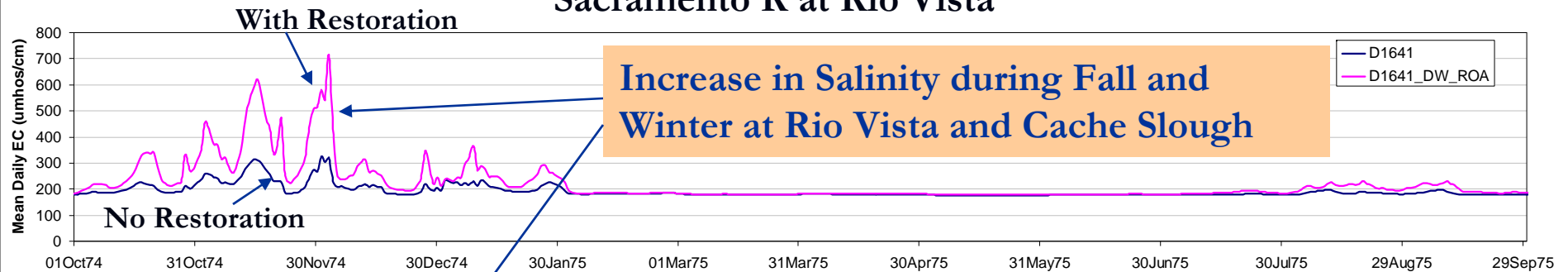
San Joaquin R. at Jersey Pt



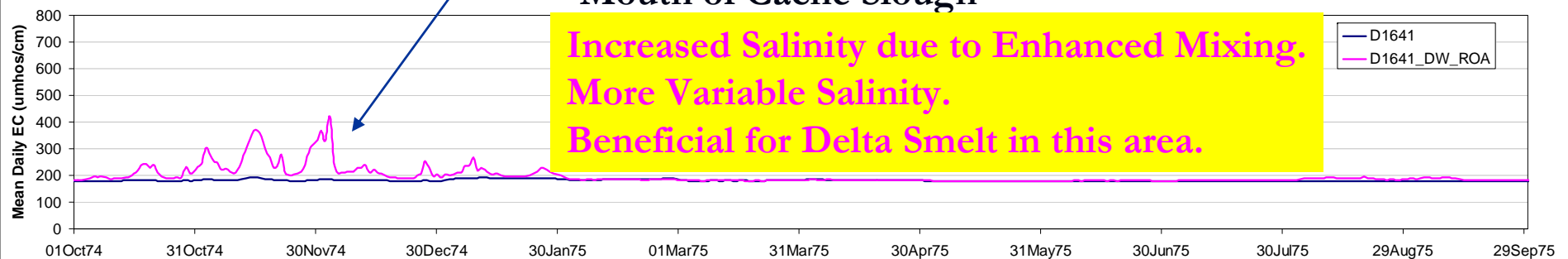
Sacramento R. at Emmaton



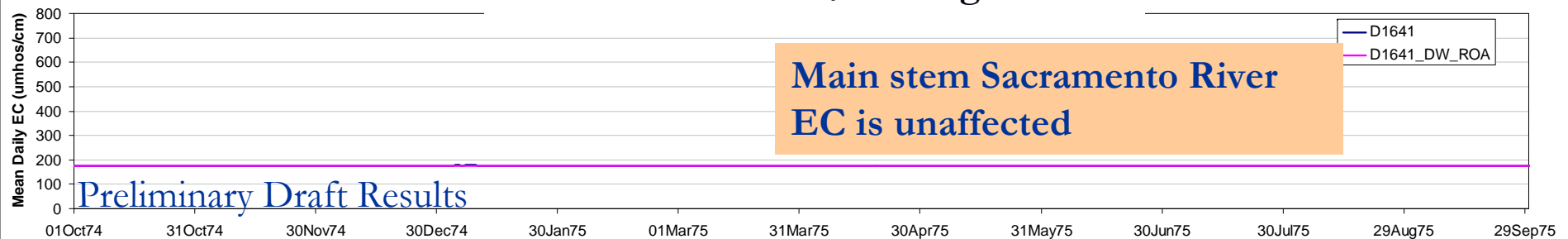
Sacramento R at Rio Vista



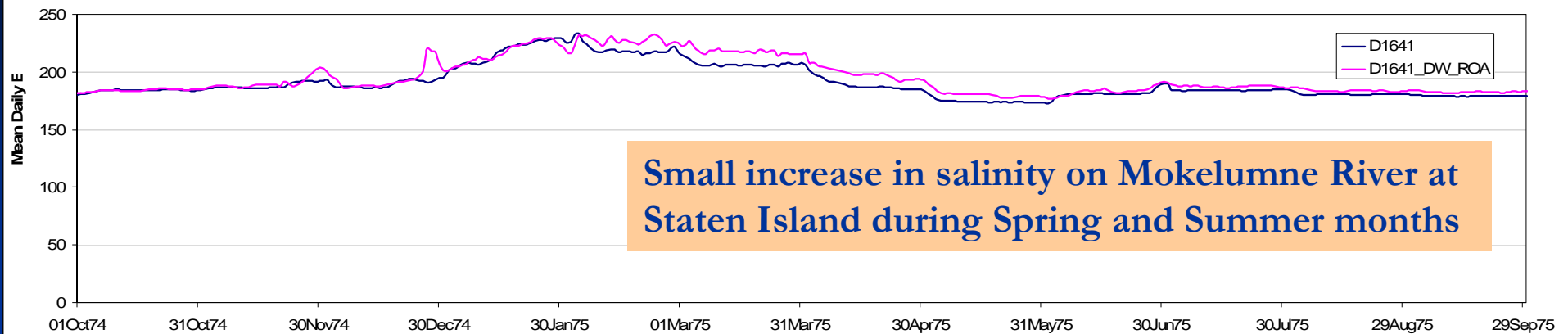
Mouth of Cache Slough



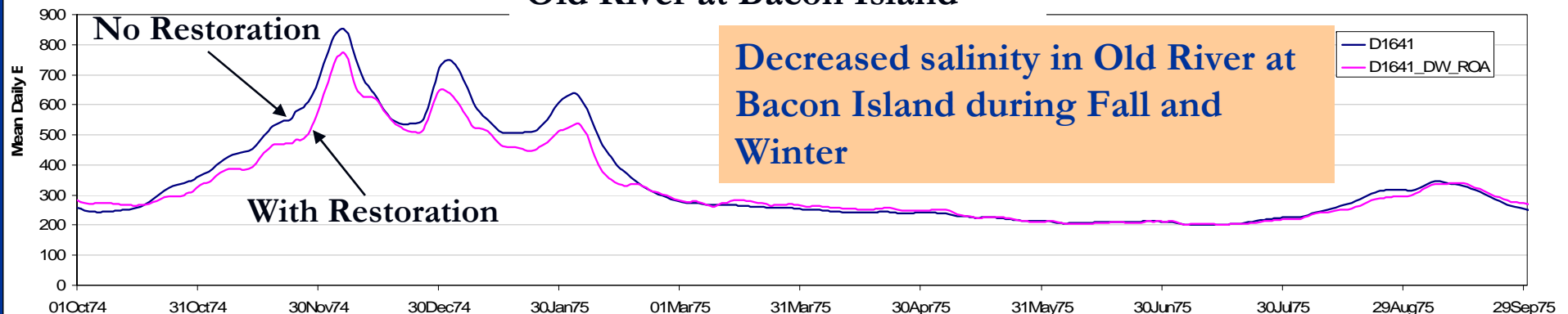
Sacramento River d/s Georgianna Sl



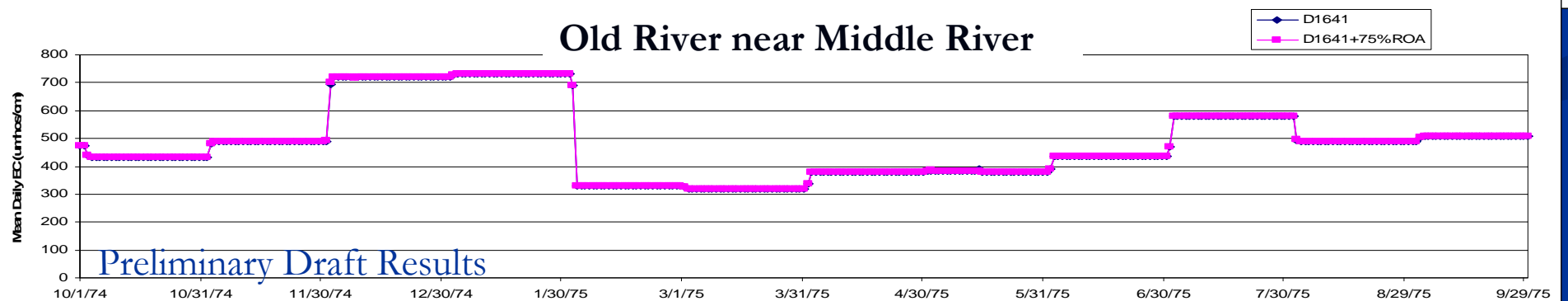
Mokelumne River near Staten Island



Old River at Bacon Island



Old River near Middle River



Key Points: Salinity Effects

(Preliminary Results)

- North Delta
 - Increased salinity intrusion on Sac R during fall and winter
 - Salinity increase and fluctuation at Cache Sl – good for smelt
 - No significant change in mainstem Sac R – good for exports
- Mokelumne - East Delta
 - Decrease in salinity intrusion on SJR during fall and winter
 - Small (perhaps negligible) increases on Mokelumne
- Central Delta and South Delta
 - Decrease in salinity intrusion on SJR during fall and winter
 - Lower salinity along Old and Middle Rivers north and west of the pumps and in the lower SJR in the fall and winter
 - No change in southeastern portions of the Delta